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(54) CLEANING PRODUCT

(71) We, FLOCK DEVELOPMENT & RESEARCH COMPANY LIMITED, a British Company, of Clarence Mill, Clarence Street, Stalybridge, Cheshire, SK14 1QF, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention concerns a cleaning product, and has for its object to provide novel forms of such a product which are particularly advantageous in comparison with abrasive pads, paper, cloths and the like presently available, one preferred embodiment thereof enabling surfaces to be cleaned efficiently and effectively, but yet without scratching or causing any similar deterioration of, or damage to, the surface, and a developed form of the invention permitting the achievement of any desired degree of abrasive action, the product then being such that it will not clog with or accumulate abraded material, and that any material which may be retained can readily be washed out.

With this object in view, the present invention provides a cleaning product characterised in that it comprises basically a flexible or pliable substrate or backing having a multiplicity of upstanding fibres on one face thereof, these fibres being interspersed with, and having adhered thereto nodules, globules, tubercles, or like particles, of polymerised resin.

It will readily be understood that in this basic form of the product, due to the high surface tension of the acrylic resin particles, a proportion of these particles will appear as globules or discrete beads carried on respective fibres at or near the free ends thereof, whilst a proportion of the particles will be attached to the fibres at or adjacent their ends connecting to the substrate, and that at least some of the particles will be adhered to,

and tend to hold together, groups of the fibres. Naturally, it will readily be further understood that the amount of the particles should not be such that there is any significant coalescence of the acrylic resin particles, such as to interfere seriously with the possibilities of the fibres bending or flexing when the product is rubbed over a surface to be cleaned with the fibres, carrying the resin particles, in contrast with said surface. This bending or flexing of the fibres, as well as the fact that the resin particles do not have any sharp corners or edges, are important factors contributing to the fact that the basic form of the product, in use, cleans without scratching.

In a modified or developed form of the product of the invention, abrasive particles, e.g. emery, sand, glass, aluminium oxide, or the like, are adhered to the fibres by the acrylic resin. Naturally, the degree of abrasive action available from this form of the product will depend upon the size and nature of the abrasive particles, and the amount thereof.

In the product of the invention the substrate or backing may take various forms. It may, for instance, be constituted by the ground fabric of a pile fabric such as a Wilton-type textile fabric, or a velvet-type fabric, the pile providing the upstanding fibres. Preferably, however, the substrate or backing is a resilient cellular backing to which upstanding nylon fibres are adhered, these fibres having been applied by electrostatic deposition after an adhesive coating has been applied to the backing.

The backing may be, for example, a natural or artificial rubber foam. Preferably the backing is of polyurethane foam or a polyester foam.

The invention also provides a method of making a cleaning product as above discussed which comprises applying, to said flexible or pliable substrate or backing having a

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5 multiplicity of upstanding fibres, so as to become interspersed in said fibres and adhered thereto, droplets of an acrylic resin which when polymerised form nodules, globles, tubercles, or like particles, adhered to the fibres.

10 The invention will be described further, by way of example, with reference to the accompanying drawing which illustrates preferred embodiments of the product and preferred methods of producing the same, it being understood that the following description is illustrative, and not limitative, of the scope of the invention. In the drawing:-

15 Fig. 1 is a diagrammatic side elevation illustrating a first method of making the product of the invention;

20 Fig. 2 is a fragmentary perspective view illustrating an abrasive pad made by the method of Fig. 1;

Fig. 3 is an enlarged fragmentary section illustrating the form of the product of Fig. 2;

25 Fig. 4 is a view similar to Fig. 1, but illustrating a second method of making the product of the invention; and

Fig. 5 is a view similar to Fig. 3 but illustrating the form of the product produced by the method depicted in Fig. 4.

30 Throughout the various figures, similar reference numerals have been allocated to similar parts.

35 Referring firstly to Figs. 1 to 3, in making a first preferred embodiment of the cleaning product of the invention one starts with a web 10 of an appropriate resilient cellular backing material in the form of flexible polyurethane foam sheet, for instance of thickness up to six or seven centimetres. This sheeting web 10 is coated with adhesive as indicated diagrammatically at 11 and has applied directly to it, by electrostatic deposition, a multiplicity of nylon fibres 12 for example from 3.0 to 4.5 mm in length and of 20 to 22 decitex thickness, the adhesive then being cured, to anchor the fibres 12 firmly to the backing web 10, by passage of the assembly through a curing oven as indicated diagrammatically at 13.

40 This having been done, the assembly is passed beneath spraying nozzles 14 whereat polymerisable acrylic resin droplets 15 are applied to the fibres 12 by spraying. Care is taken to ensure that the viscous condition of the resin and its manner of spraying which may be airless spraying, or spraying by means of an electrostatic spray gun, is such that discrete droplets encounter and become deposited on the fibres 12, and that the quantity and distribution of such droplets 15 is such that there is no significant coalescence of adjacent droplets on the fibres, the droplets becoming beads or globules, as indicated at 16 in Fig. 3, attached to individual fibres 12 or to groups of the fibres 12 at, or near their free ends, or becoming nodules, tubercles or

like around the individual fibres 12, or groups thereof, near to their tips. These resin droplets 15 having been applied, the web 10 is passed through a second curing oven 17 (or alternatively is caused to make a second pass through the oven 13 referred to above) so as to cause the applied acrylic resin particles to polymerise and become firmly anchored to the fibres 12. This curing ensures that the acrylic resin globules 16 fuse at least on their surfaces and no sharp edges or corners remain on the droplets, as can be seen from Fig. 3.

70 The resultant sheeting is then cut up into cleaning pads of any desired practical size or shape of which an example is shown in Fig. 2. These pads have various uses. In the dry condition, they may be used for example for renovating suede leather garments, brushing upholstery, and for like purposes. In the wet condition, the product can be used for a wide range of cleaning operations, for example the washing of crockery or cooking utensils, cleaning of paintwork, including the paintwork of motor vehicles, and the cleaning of chrome, silver, and plastics surfaces. The action of the product is to emulsify grease, dirt, and the like adherent to the surface being cleaned, so as to separate it from said surface. There is no scratching or other spoiling of the surface, because the fibres 12 flex as the product passes over the surface and there is no gouging or tearing action arising therefrom, due to the globular or bead like particles 16 on the tips of the fibres 12.

100 Variations may be made to the example just described. Thus, for instance, the fibres 12, instead of being separately applied individual fibres each adhered by one end to the backing web 10, may be provided by the pile fibres of a pile fabric, for example, a Wilton-type textile fabric, a velvet-type fabric or other woven pile material. Such a fabric, when used in the present invention, may be backed with an appropriate foam backing of any suitable nature such as latex foam, or polyurethane foam, if desired.

105 Figs. 4 and 5 illustrate another modification which includes the additional step, after having applied the droplets 15 of polymerisable acrylic resin to the fibres 12, of depositing thereon highly abrasive particles 18, such as grit, sand, emery, carborundum, silica or aluminium oxide, of any selected size from very-fine to very coarse, so as to become adhered to the tips of the fibres 12, for example by passing the web 10 with the attached fibres 12 and the applied resin droplets 15, beneath a sprinkling head 19, before passing the resultant combination through the second heating oven 17. This development of the product of the invention, which is illustrated in Figure 5, is particularly advantageous for practical applications where a surface finish is required to be achieved by

removal of material from the surface, and of course because the backing web 10 is resiliently flexible, the product can be caused to conform to any of the contours of the work-piece being abraded. The spaces between the fibres 12 in the product minimise the possibility of clogging of the product in use, and, of course, any accumulated abraded material can readily be washed out from between the fibres 12.

WHAT WE CLAIM IS:-

1. A cleaning product characterised in that it comprises basically a flexible or pliable substrate or backing having a multiplicity of upstanding fibres on one face thereof, these fibres being interspersed with, and having adhered thereto, nodules, globules, tubercles, or like particles, of polymerised acrylic resin.
2. A product as claimed in claim 1 wherein the particles are present in an amount sufficient to appear as globules or discrete beads carried on respective fibres at or near the free ends thereof, with some of the globules being adhered to, and holding together, groups of the fibres.
3. A product as claimed in claim 1 or 2 wherein the globules or beads are of configurations having no sharp corners or edges.
4. A product as claimed in claim 1, 2 or 3 wherein abrasive particles are adhered to the fibres by the acrylic resin.
5. A product as claimed in claim 4 wherein the abrasive particles are of emery, sand, glass, or aluminium oxide.
6. A product as claimed in any preceding claim wherein the substrate comprises a resilient cellular backing to which upstanding nylon fibres are adhered.
7. A product as claimed in claim 6 in which the substrate comprises a Wilton-type fabric, or a velvet-type fabric, the pile providing the upstanding fibres, a cellular foam backing being adhered to said Wilton-type fabric.
8. A cleaning product substantially as hereinbefore described with reference to and as illustrated in Figs. 2 and 3 and in Fig. 5 of the drawing.
9. A method of making a product as

defined in claim 1, which comprises applying, to said substrate or backing having a plurality of upstanding fibres, so as to become interspersed in said fibres and adhered thereto, droplets of an acrylic resin which when polymerised form nodules, globules, tubercles, or like particles, adhered to the fibres.

10. A method as claimed in claim 9 wherein the upstanding fibres are sprayed onto an adhesive layer so as to be adhered each by one end, by the adhesive, to a cellular backing.

11. A method as claimed in claim 10 wherein the backing is made of natural or artificial rubber foam.

12. A method as claimed in claim 10 wherein the backing is made of a polyurethane foam or a polyester foam.

13. A method as claimed in any of claims 9 to 12 wherein the upstanding fibres are adhered to the backing using a flexible adhesive.

14. A method as claimed in any of claims 9 to 13 wherein abrasive particles are sprinkled over the product so as to become adhered to the fibres.

15. A method as claimed in claims 13 and 14 in which the steps of the method corresponding to application of adhesive to the substrate or backing, and application of the particles, is performed on a web of the material forming said substrate or backing, which web is progressed past appropriate adhesive-applying, resin applying and curing stations.

16. A method as claimed in claim 15 in which the web is subsequently severed into blocks or pads.

17. A method of making a cleaning product substantially as hereinbefore described with reference to Figs. 1 to 3 of Figs. 4 and 5 of the accompanying drawing.

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